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13. ABSTRACT (Maximum 200 words) <p>The <i>Advances in Type Systems for Computing (ATSC)</i> Euroconference was held at the Isaac Newton Institute in Cambridge from August 14 through 18, 1995. The main topic of the conference was the development and use of type systems for programming languages. The reason for interest in type systems is that types are the fundamental systems of "units" for computer programming, analogous to meters, joules and kilograms in physics. Type systems for programming languages make it possible to perform simple checks on computer programs and detect certain forms of errors before the programs are executed. Type systems are also an important part of software system design, particularly in design procedures that involve breaking a complex systems into separate parts.</p> <p>The ATCS conference program consisted of invited lectures, contributed papers, and on-the-spot contributions to impromptu sessions that were organized during the meeting. There were a total of 73 attendees, including 24 scientific visitors to the Newton Institute, 3 outside invited speakers, and 24 authors of contributed talks.</p>				
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Final Technical Report

Advances in Type Systems for Computing

ONR Travel Grant *Navy N00014-95-1-0999*

John C. Mitchell, PI

June 30, 1995

This grant funded travel of US participants in the *Advances in Type Systems for Computing* conference.

The *Advances in Type Systems for Computing (ATSC)* Euroconference was held at the Isaac Newton Institute in Cambridge from August 14 through 18, 1995. The main topic of the conference was the development and use of type systems for programming languages. The reason for interest in type systems is that types are the fundamental systems of “units” for computer programming, analogous to meters, joules and kilograms in physics. Type systems for programming languages make it possible to perform simple checks on computer programs and detect certain forms of errors before the programs are executed. Type systems are also an important part of software system design, particularly in design procedures that involve breaking a complex systems into separate parts.

The ATCS conference program consisted of invited lectures, contributed papers, and on-the-spot contributions to impromptu sessions that were organized during the meeting. There were a total of 73 attendees, including 24 scientific visitors to the Newton Institute, 3 outside invited speakers, and 24 authors of contributed talks.

The conference Call for Participation emphasized three related areas:

- extensions of the ML type system
- types in object-oriented programming
- type theories for reactive systems

The listed topics, and several others, were well-represented in the program. A surprisingly large fraction of the invited and contributed talks emphasized type systems for object-oriented programming. In fact, this active and

vibrant area accounted for 6 of 12 invited talks and 12 of 22 contributed talks. As a result, the conference had an unexpectedly sharp focus, leading to repeated discussion of type systems for object-oriented programming during coffee breaks and free time. Object-oriented type systems are a topical and important area since object-oriented languages provide one promising approach for improving in software productivity. Scientific progress on the underlying type systems of object oriented languages could significantly improve our understanding of software development, leading to improved programming languages and more effective program-development tools. In retrospect, it seems that the ATSC meeting was close to a watershed event for researchers and students in this particular subject area.

The format of the conference placed the primary invited and contributed talks between 9:30 AM and 2:30 PM. This left time for daily 3-5 PM special sessions, organized during the meeting by Newton Institute scientific visitors, at the invitation of the ATSC committee. This organizational strategy successfully attracted participation from scientific visitors then in residence and broadened the scope of the conference. With parallel sessions on Tuesday afternoon, and Wednesday left open for informal gatherings in the City of Cambridge, the four afternoon special sessions were:

- Object systems, chaired by L. Cardelli (DEC Systems Research Center), Newton Scientific Visitor and member of the ATSC organizing committee,
- Linear logic and games, chaired by Newton Scientific Visitor P. Scott (University of Ottawa),
- Constraint systems, chaired by ATSC invited speaker S. Smith (Johns Hopkins),
- Sign-up session or short talks by students and postdoctoral fellows, chaired by A. Gordon (University of Cambridge),
- Interim report on the ML2000 programming language project, chaired by R. Harper (CMU) and D. MacQueen (AT&T Bell Laboratories), both Newton Scientific Visitors.

The afternoon of short sign-up talks allowed students and post-doctoral-level participants to give short talks about current work.